



# Finding your Feet for Fall Prevention

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IAYT SYTAR 2019



## METHODS

We launched a 16 item needs assessment questionnaire to assess interest and feasibility of launching a yoga class in a rural area. A 10 member community advisory board gave us input. We partnered with Aging and Disability Resource Centers of 4 rural counties (pop. 130,078) in Southwest Wisconsin in 2014 to recruit community living older adults for the study.

Inclusion Criteria	Exclusion Criteria
Males and females Age 60 and older Able to walk 150 feet without assistance Cognitively intact	Pelvic or lower extremity injury or orthopedic surgery in the previous 12 months. Physician instructions to avoid low intensity exercise. Neurologic condition that impairs strength or balance Not expected to live 6 months or more. Practiced yoga in the past 6 months

3 groups of 1 hour Hatha yoga classes twice weekly for 8 weeks. Poses were modified for individuals based on abilities and to increase range of motion. Half of participants were asked to practice yoga exercises for 10 minutes and do relaxation for 5 minutes, the other half was asked to do 5 minutes of relaxation on days without yoga classes and document practice in a log book. The 3 home exercise poses selected from class poses were: Chair (Utkatasana), Tree (Vrksasana) and High or Crescent Lunge (Alanasana). We created a teacher's handbook.

Data Collection at baseline and after class completion. Activities Specific Balance Confidence scale,<sup>6</sup> Berg Balance Scale,<sup>7</sup> Functional Gait Assessment<sup>8</sup> and Dynamic Gait Index.<sup>9</sup> At baseline number of falls in the past 1 month, 6 months and 1 year. 2 & 4 months after class completion, phone calls assessed falls in the past 6 months.

## ACKNOWLEDGEMENT

This study was funded by the Wisconsin Partnership Program

## CONCLUSION

This pilot project suggests that yoga classes reduced self-reported falls and improved balance measures. Home practice did not improve most outcomes over class attendance alone. Ceiling effects limited interpretation of some outcomes. Our needs analysis found strong interest in yoga in this rural older population. Yoga can contribute to economic savings and quality of life improvement given the great number of older persons at risk for falls. These findings need to be confirmed in a larger, longer randomized trial.

## RESULTS

225 surveys were returned with 11 unusable and 214 included in the **needs analysis**. Cost was listed as the biggest concern about trying yoga

Feedback from the **community advisory board** and initial survey results showed that a twice weekly yoga class was preferred over a weekly class.

Of 43 participants 1 dropped out after 1 class, 1 had an unrelated injury and 1 was on the advisory board

Reported practice at:

- 2 months: 12 individuals (63%), avg. 2.1 times
- 4 months: 7 individuals (37%), avg. 1.6 times

All improved significantly on falls, Berg Balance, Functional Gait Assessment, Dynamic Gait Index. The only between group difference was on fear of falling, the Activities Specific Balance Confidence scale.

## Results of Intervention Study (n=38)

Test (possible points)	Intervention Groups Combined		P-value	Yoga Practice		Relaxation Only		P-value Yoga vs. Relaxation interaction
	Before	After		Before	After	Before	After	
Falls, 6 months	26	1	p<.001	11	0	15	1	p=.554
BB Scale (56)	53	54	p=.002	53.7	54.3	51.7	53.4	p=.102
BB time R leg stand, seconds	13.3	17.1	p=.02	18.7	22.7	7.8	11.6	p=.953
BB: Functional Reach Distance	26.0	29.6	p<.001	26.4	30.6	25.5	28.7	p=.414
BB Tandem Stand	3.5	3.7	p=.009	3.7	3.8	3.3	3.7	p=.136
BB: Single Leg Stand	2.5	2.8	p=.013	3.2	3.1	1.9	2.5	p=.119
FGA (30)	22.9	25.8	p<.001	24.0	27.0	21.8	24.6	p=.762
FGA 20 foot gait (seconds)	5.6	5.3	p<.001	5.5	5.1	5.7	5.5	p=.324
Dynamic Gait Index (24)	20.6	22.4	p<.001	21.05	22.79	20.05	22.05	p=.648
ABC Scale total	89.3	91.5	p=.082	88.4	93.4	90.1	89.7	p=.045
ABC Inside Activities score	91.7	93.2	p=.27	91.7	94.6	91.7	91.9	p=.327
ABC Outside Activities score	89.7	90.5	p=.491	89.6	92.7	89.8	88.3	p=.063

BB= Berg Balance; FGA= Functional Gait Assessment

**48% reduction in fall** comparing 6 months prior to intervention to 6 months after the intervention started. 15 individuals having 27 falls dropped to 13 individuals having 14 falls.

## Needs analysis survey results

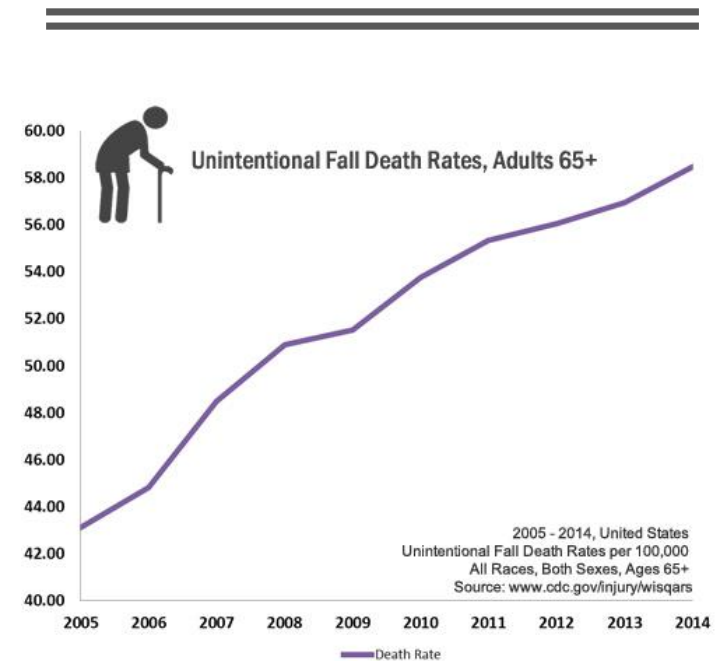
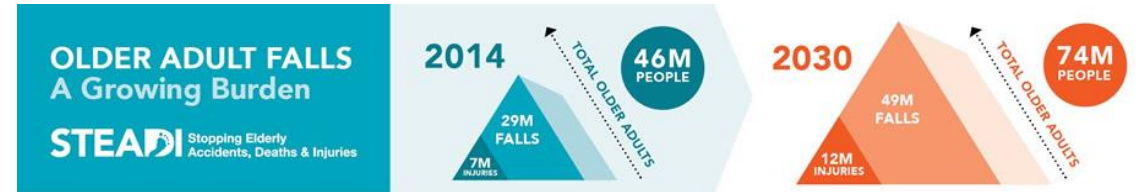
Demographic Information (n=214); female 154 (72%); Age, average 44 (range 26-91)			
Survey Questions, Yes/No	Yes	No	
Have you practiced yoga for more than 1 month in the past?	51 (24%)	160 (75%)	
If yes, how long did you practice yoga? More than 3 months?	37 (62%)	23 (38%)	
Do you know someone who has done yoga before?	131 (65%)	63 (31%)	
If yes, would you try yoga because of their experience?	102 (67%)	28 (18%)	
Do you have access to a yoga class within a 10 mile radius?	95 (47%)	53 (26%)	
Survey Questions			N (%)
If you have practiced yoga in the past, would you rate your experiences as:			68 (100%)
- Positive			42 (62%)
- Somewhat positive			11 (16%)
- Neutral			9 (13%)
- Somewhat negative			5 (7%)
- Negative			1 (1%)
How many times have you fallen in the	none	1 Fall	>1 Fall
- Last month? (N=144)	115 (80%)	18 (12%)	11 (8%)
- Last 6 months? (N=102)	78 (76%)	15 (15%)	9 (9%)
- Last year? (N=101)	58 (57%)	25 (25%)	18 (18%)
Would you be more likely to: (1: not very likely, 10: very likely)			Likert Scale (SD)
Attend a yoga class if it was once a week? (N=161)			6.39 (3.56)
Attend a yoga class if it was twice a week? (N=141)			5.06 (3.36)
Attend a yoga class if it was 1 hour long? (N=128)			5.75 (3.54)
Attend a yoga class if it was 45 minutes long? (N=142)			6.09 (3.46)
Attend a class titled • A Balanced Body/Mind? (N=154)			6.06 (3.30)
Attend a class titled • Flexibility for Health Aging? (N=159)			6.65 (3.08)
Attend a class titled • Fall Prevention Yoga? (N=150)			5.71 (3.17)
Attend a class titled • Mindful Movement? (N=145)			5.54 (3.14)
Attend a class titled • Yoga? (N=138)			6.40 (3.40)
Attend a class titled • Yoga for Health Aging? (N=167)			6.64 (3.18)
Practice yoga at home if it was 3 times a week? (N=152)			5.25 (3.18)
Practice yoga at home if it was every day? (N=132)			4.07 (3.12)
Practice yoga at home if there were only 3 exercises? (N=136)			5.73 (3.21)
Practice yoga at home if it took 20 minutes? (N=152)			6.39 (3.23)
Practice yoga at home if it took 30 minutes? (N=138)			5.63 (3.24)

N varies as some respondents did not answer all questions.

## Concerns about participating in Yoga



1 in 3 People over the age of 65 fall each year. 1 in 2 over the age of 80!



# Consequences of Falls

01

20-30% of those who fall suffer moderate to severe injuries such as lacerations, hip fractures, or head trauma (CDC)

02

Each year in the US, at least 300,000 older people are hospitalized for hip fractures. More than 95% of hip fractures are caused by falling (CDC)

03

The 1-year mortality rate after a hip fracture is reported to be 14 to 58% (Schnell et al, *Geriatric Orthopaedic Surgery & Rehabilitation*. 2010)

04

**40%** of new Nursing Home admissions in Wisconsin had a fall in the last 30 days (WI DHS)

## Check Your Risk for Falling

Please circle "Yes" or "No" for each statement below.		Why it matters
Yes (2)	No (0)	I have fallen in the past year. People who have fallen once are likely to fall again.
Yes (2)	No (0)	I use or have been advised to use a cane or walker to get around safely. People who have been advised to use a cane or walker may already be more likely to fall.
Yes (1)	No (0)	Sometimes I feel unsteady when I am walking. Unsteadiness or needing support while walking are signs of poor balance.
Yes (1)	No (0)	I steady myself by holding onto furniture when walking at home. This is also a sign of poor balance.
Yes (1)	No (0)	I am worried about falling. People who are worried about falling are more likely to fall.
Yes (1)	No (0)	I need to push with my hands to stand up from a chair. This is a sign of weak leg muscles, a major reason for falling.
Yes (1)	No (0)	I have some trouble stepping up onto a curb. This is also a sign of weak leg muscles.
Yes (1)	No (0)	I often have to rush to the toilet. Rushing to the bathroom, especially at night, increases your chance of falling.
Yes (1)	No (0)	I have lost some feeling in my feet. Numbness in your feet can cause stumbles and lead to falls.
Yes (1)	No (0)	I take medicine that sometimes makes me feel light-headed or more tired than usual. Side effects from medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I take medicine to help me sleep or improve my mood. These medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I often feel sad or depressed. Symptoms of depression, such as not feeling well or feeling slowed down, are linked to falls.
<b>Total</b> _____		

Add up the number of points for each "yes" answer. If you scored 4 points or more, you may be at risk for falling. Discuss this brochure with your doctor.

\*This checklist was developed by the Greater Los Angeles VA Geriatric Research Education Clinical Center and affiliates and is a validated fall risk self-assessment tool (Rubenstein et al. J Safety Res; 2011;42(6):493-499). Adapted with permission of the authors.

[www.cdc.gov/injury](http://www.cdc.gov/injury)  
[www.stopfalls.org](http://www.stopfalls.org)

## Research says look for programs with these components for fall prevention :

Varied Activity: The best classes include both strength exercises and balance challenges. Class should include a warm-up and activities that become more challenging over time.

Balance: It should be the most important kind of activity. Balance activities should challenge you when you are moving, when multi-tasking and when standing still. Examples include balancing with feet together, heel to toe, one legged standing, reaching, turning and shifting weight.

Strengthen: to improve everyday activities such as carrying groceries or getting up from a chair or toilet. This is important for safe movement BUT improving strength alone is not enough to prevent a fall!

Gait enhancement: to provide awareness and assist with safe movement through balance and strength.

# 50 hour role for effective fall prevention programs and creating a healthy habit

Sherrington, Whitney, Lord, Herbert, Cumming, Close. Effective Exercise for the prevention of Falls: A Systematic Review and Meta-Analysis. JAGS, December 2008, 56:2234-2243

**On average, it takes more than 2 months before a new behavior becomes automatic — 66 days to be exact.** And how long it takes a new habit to form can vary widely depending on the behavior, the person, and the circumstances. In Lally's study, it took anywhere from 18 days to 254 days for people to form a new habit.

**From: How Long Does it Actually Take to Form a New Habit? (Backed by Science)**

By [James Clear](#)

[Br J Gen Pract](#). 2012 Dec;62(605):664-6. doi: 10.3399/bjgp12X659466.

**Making health habitual: the psychology of 'habit-formation' and general practice.**

[Gardner B](#)<sup>1</sup>, [Lally P](#), [Wardle J](#).

PMID: [23211256](#) PMCID: [PMC3505409](#)

Dr. Karyn Purvis of Texas Christian University says, it takes over **400** repetitions to create a synapse in the brain (true learning) without playful engagement

OR

about **12** repetitions to create a synapse when you use play to teach. So, if you really want to effectively and efficiently teach your children (or anyone for that matter), use PLAY!

<https://child.tcu.edu/resources/#sthash.wSxbzwTM.dpbs>



# Dance of Shiva



- Hold on to a chair for balance.
- Step forward with one foot and rock between back and front foot.
- Increase dance, by balancing on front foot while stepping back foot forward to knee bent and foot slightly off floor. Then return foot back to original spot.
- Continue dance by adding non-chair-supported hand and arm to sequence. Arch that hand and arm over head.
- Repeat on other side.

# Foundation: A Balanced Foot

## The bottom of the foot



Four corners of the bottom of the foot

Arches

- Anterior Transverse Arch
- Lateral Longitudinal Arch
- Medial Longitudinal Arch

Kurchashira Marma point

Balancing energy directions (Purva and Pa

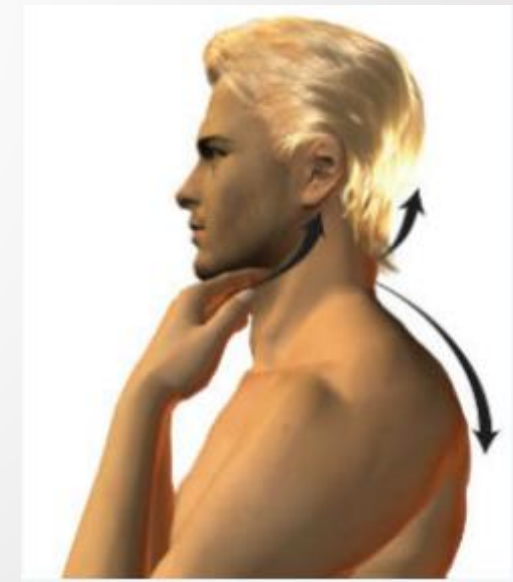
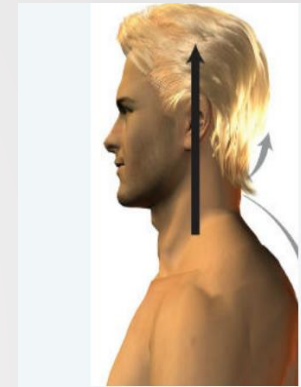
# Expansion: Awareness of Forward Head Tilt

A flexed posture in elderly patients is associated with impairments in postural control during walking.

[de Groot MH](#)<sup>1</sup>, [van der Jagt-Willems HC](#)<sup>2</sup>, [van Campen JP](#)<sup>3</sup>, [Lems WF](#)<sup>4</sup>, [Beijnen JH](#)<sup>5</sup>, [Lamoth CJ](#)<sup>6</sup>.

A flexed posture (FP) is characterized by protrusion of the head and an increased thoracic kyphosis (TK), which may be caused by osteoporotic vertebral fractures (VFs).

Impairments in postural control during walking are a major risk factor for falling: the results indicate that patients with FP have impaired postural control during walking and might therefore be at increased risk of falling.



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